

REMARKS

This Amendment, filed in reply to the Office Action dated March 24, 2005, is believed to be fully responsive to each point of rejection raised therein. Accordingly, favorable reconsideration on the merits is respectfully requested.

Claims 1-8 remain pending in the application. Claims 1, 3, 5 and 7 have been rejected under 35 U.S.C. § 102 as being anticipated by Koehler (U.S.P. 5,062,689). Claims 2, 4, 6, and 8 have been rejected under 35 U.S.C. § 103 as being obvious over Koehler in view of Johnson (U.S.P. 6,628,390).¹ Applicant respectfully submits the following arguments in traversal of the prior art rejections.

Applicant's invention relates to a light modulator that is simple to fabricate and allows improved miniaturization. A conventionally known light modulator is similar to that described in the Koehler reference. Referring to Fig. 2 of Koehler, the conventional modulator includes an opaque substrate 110 (col. 2, lines 40-45) with through hole apertures 111 passing light emitted from a light source. The light is modulated via a shutter 120 movably disposed over the aperture openings. The shutters become activated under an electrostatic force (between plates 130, 131) and a restoring force of a spring (Fig. 2, element 140). Because of the need to create the through holes through the opaque substrate, the manufacturing process is difficult and miniaturization is limited.

Applicant's invention obviates the above deficiencies. Referring to an exemplary embodiment illustrated by Figs. 1A-1B, a pixel drive circuit 14 is formed in a silicon layer 13,

which is formed over insulator layer 12 and a silicon film 11. Pixel electrodes 20 comprise part of a micro-electromechanical (MEM) modulating device. A temporary support 17 is added so that the layer 11 can be replaced by a transparent glass substrate 18. The support 17 is removed and the MEM device is disposed over the drive circuit layer 14. The transparency of the substrate 18 allows the drive circuits to be formed at arbitrary positions and eliminates the need to form through holes in the substrate for light transmission.

The Examiner contends that Koehler teaches each feature of independent claim 1. However, the rejection is not supported because Koehler merely corresponds to a conventionally known opaque substrate light modulating structure. In particular, the substrate 110 identified by the Examiner is opaque and not light transmissive.

Moreover, claim 1 describes that a pixel drive circuit is formed on the transparent substrate to form a non-transparent area. However, in Koehler, the pixel drive circuit (Fig. 4, element 50) is embedded within an opaque substrate section. Claim 1 describes that the pixel drive circuit dictates where a non-transmissive area will be formed. By contrast, Kohler describes a starting opaque material where a through hole aperture must be created. The difference permits a greater degree of freedom in manufacture of the present invention in comparison to the device of Koehler. Therefore, claim 1 is not anticipated for at least these reasons.

Because claims 3, 5 and 7 also include a description of the transparent substrate, these claims are not anticipated by Koehler for at least the first reason set forth above for claim 1.

¹ The undersigned confirmed with the Examiner the patent number of the Johnson reference cited at page 4 of the Detailed Action.

AMENDMENT UNDER 37 C.F.R. § 1.111
Appln. No.: 10/849,263

Attorney Docket No.: Q81713

With further regard to claims 3 and 5, these claims describe the elimination of a silicon film layer. The Examiner identifies layer 110 in Koehler as teaching this layer. However, it is clear that the layer 110 is never eliminated since it comprises the basic support structure for the completed modulator. Therefore, claims 3 and 5 are patentable for this additional reason.

The remaining claims are patentable based on their dependency, and Johnson does not make up for the deficiencies of Koehler.

Applicant adds claims 9-14 to describe features of the invention more particularly.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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23373

CUSTOMER NUMBER

Date: September 23, 2005